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NOTES ON SOME MAMMALS OF NORTH-CENTRAL TEXAS

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For more than a century, naturalists and others interested in the fauna and flora of north-central Texas have provided information about the wildlife and vegetation there. Captain Randolph B. Marcy, who led several expeditions to the area in the 1850s, provided early information on natural history of the region in his various reports (Marcy and McClellan, 1853, 1854; Marcy, 1856, 1874). Additional government surveys were carried out in the region in 1876 (Baker, 1985). Information on the mammals of north-central Texas was provided in the works by Bailey (1905), Davis (1974), and Hall (1981). Specific treatments of mammals of the area were contributed by Dalquest (1968) and Dalquest and Horner (1984).

The purposes of this report are to present some additional information on the mammals of north-central Texas and to make known to science the existence of additional specimens of mammals from the area heretofore unreported in the literature.

METHODS AND MATERIALS

Specimens of mammals reported herein were obtained by us during more than two decades of periodic visits to north-central Texas. These specimens were assembled in order to document geographic and ecologic distribution of mammals in connection with a wide array of teaching and research activities. Mammals were collected by hand, snap traps, live traps, mist nets, hand nets, and guns. Some specimens found dead on roads were

salvaged. Specimens were prepared mostly in the field as conventional museum skins accompanied by skulls, some partial skeletons and embryos were retained, and some specimens were preserved in fluid. Specimens, field notes, catalogues, photographs, and other related information were deposited at the Museum of Natural History, Tulane University, the United States National Museum of Natural History, and The Museum, Texas Tech University. In the accounts of species in this paper, synonymies were not included because that information was made available by Hall (1981). Keys to the mammals of the area were presented by Hall (1981), and additional information about identification of species that occur in north-central Texas was presented by Dalquest and Horner (1984). Vernacular names and the order of presentation were taken from Jones *et al.* (1986). Data on geographic localities are presented herein directly from the labels on specimens that were examined by us.

DESCRIPTION OF THE AREA

Our study area included 12 counties in north-central Texas, five bordered on the north by the Red River (Fig. 1). The area averages about 1000 feet in elevation above sea level. There are two major vegetational areas, the Rolling Plains and the Cross Timbers and Prairies. The western part of this geographic area is in the Rolling Plains; the eastern part of the region is included in the Cross Timbers and Prairies (Dalquest and Horner, 1984; McMahan *et al.*, 1984). The western part of north-central Texas was included in the Mesquite Plains Biotic Province by Blair (1950, 1954). Based on the geographic distributions of mammals, Schmidly (1983, 1984b) defined four regions of Texas. The area studied in north-central Texas is included in the Plains Country Region, which extends as far east as the Balcones Fault Zone.

The Rolling Plains area is a southern extension of the Great Plains of the central United States. The original prairie grasses were little bluestem, big bluestem, sand bluestem, sideoats grama, hairy grama, blue grama, Indian grass, Canada wildrye, western wheatgrass, buffalograss, tobosa grass, three-awn grass, tall dropseed, and hooded windmill grass (Dalquest and Horner, 1984). Mesquite has invaded all of the Rolling Plains. There is some controversy with regard to how long mesquite has been in the area. Based on counts of tree rings of old stumps, Dalquest and Horner (1984) reported that the trees were more than 60 years old at the time of cutting. Bailey (1905) described mesquite trees

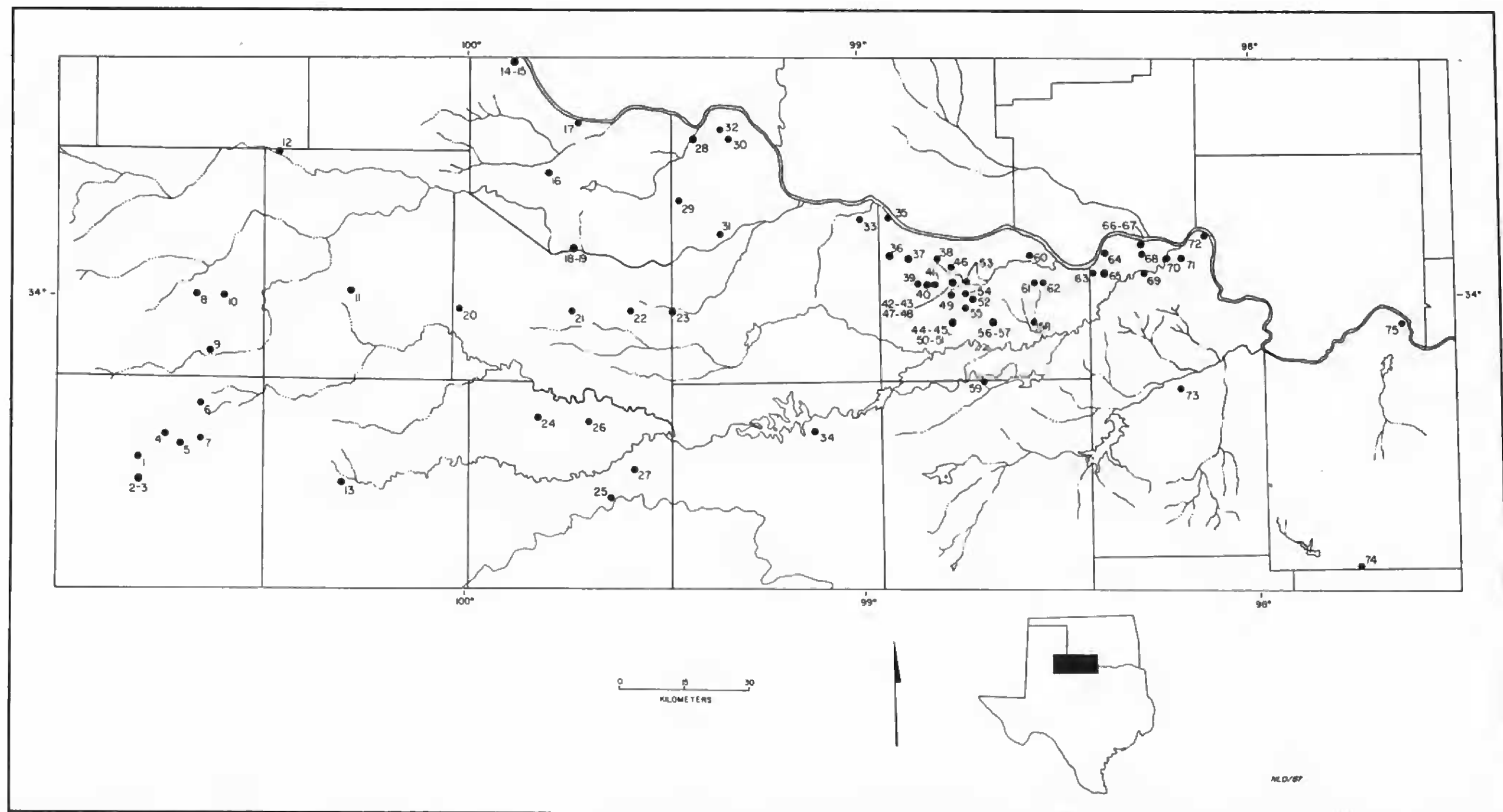


FIG. 1.—Map of north-central Texas. Numbers of localities on the map correspond to the numbers in the list of localities in text.

in the vicinity of Henrietta, Texas. Western ragweed, tumble grass, sandburs, and other plants have invaded areas where the lands are overgrazed by livestock (Gould, 1962). The Cross Timbers and Prairies (West Cross Timbers) vegetation that occurs in north-central Texas includes little bluestem, big bluestem, Indian grass, switchgrass, Canada wildrye, sideoats grama, hairy grama, tall dropseed, and Texas wintergrass (Dalquest and Horner, 1984). The vegetation of the West Cross Timbers ranges from open savannah to dense brush consisting mostly of post oak and blackjack oak (Gould, 1962; McMahan *et al.*, 1984).

Marcy (1874) provided an interesting description of the West Cross Timbers: "At six different points I have found the Cross Timbers with the same peculiarities—the trees standing at such intervals that wagons can pass between them. The soil is thin, sandy, poorly watered. This forms a boundary line between the country suited to agriculture and the great prairies, which for the most part are arid and destitute of timber. It seems to have been designed as a natural barrier between the civilized man and the savage. . . ." The early settlers in north-central Texas considered the open prairies with great trepidation. However, Marcy led an expedition through the region in 1852 and put many of these fears to rest with his description of the prairies. "This barren district, however, exhibits one characteristic which compensates for many of its asperities. Perhaps no part of the habitable globe is more favorable to health and the continuation of human existence than this. Free from marshes, stagnant water, and all other sources of malaria, and open to every wind that blows, this immense grassy expanse is purged from impurities of every kind, and the air imparts a force and vigor to the body and to the mind which repays the occupant is great measure for his deprivation" (Marcy, 1874).

The Red River and the Brazos River, and their tributaries, provide drainage for most of this geographic region of north-central Texas. There are intermittent bands of riparian vegetation along these rivers. This vegetation is referred to as cottonwood-hackberry-saltcedar brush/woods by McMahan *et al.* (1984), and includes mostly *Populus deltoides*, *Celtis*, and *Tamarix*. Apart from these major rivers and their tributaries, there are bands of deep, sandy soils and almost pure sandy terraces (Dalquest and Horner, 1984). In some areas, winds have spread the sands back several miles from the rivers. Some of these sandy bands are narrow in width; but in numerous areas there are broad sheets of

sandy soils or terraces that were formed by wind action or deposited by meandering streams. It is possible that these areas of sandy soils may be expanding in the region because of the prevailing winds that occur there, as well as changes in land-use practices that result in enhanced erosion of the soils. For additional discussions of the impacts of land-use practices on the soils, vegetation, and mammals of north-central Texas, see the work by Dalquest and Horner (1984).

LIST OF LOCALITIES

The localities in north-central Texas given below are plotted in Figure 1. DICKENS CO.: 1) 3.5 mi. N Dickens; 2) 0.3 mi. N Dickens; 3) Dickens; 4) 4 mi. E, 7 mi. N Dickens; 5) 6 mi. E, 5 mi. N Dickens; 6) 9 mi. E, 11 mi. N Dickens; 7) 9 mi. E, 6 mi. N Dickens. MOTLEY CO.: 8) 5.8 mi. E Matador; 9) 9 mi. E, 8 mi. S Matador; 10) 11 mi. E Matador. COTTLE CO.: 11) Paducah; 12) 10 mi. E, 20 mi. N Paducah. KING CO.: 13) 2.1 mi. W Guthrie; HARDEMAN CO.: 14) 20.3 mi. N Goodlett; 15) 8 mi. N Goodlett; 16) 4.3 mi. W Quanah; 17) 8.3 mi. N Quanah; 18) 13 mi. S Quanah; 19) 14 mi. S Quanah. FOARD CO.: 20) 18 mi. W Crowell; 21) Crowell; 22) Thalia; 23) 6 mi. E Thalia. KNOX CO.: 24) Truscott; 25) 3 mi. E Benjamin; 26) Gilliland; 27) Vera. WILBARGER CO.: 28) 0.7 mi. S Odell; 29) 6 mi. W, 5 mi. N Vernon; 30) 5 mi. E Odell; 31) Vernon; 32) 15 mi. N, 1 mi. E Vernon; 33) 1 mi. E, 2 mi. N Elliott. BAYLOR CO.: 34) 12 mi. NE Seymour. WICHITA CO.: 35) 10 mi. N Electra; 36) 4 mi. N Electra; 37) 2.5 mi. E Haynesville; 38) 7 mi. E Haynesville; 39) 4 mi. E Electra; 40) 5.7 mi. E Electra; 41) 6 mi. E Electra; 42) 8.7 mi. E Electra; 43) 9 mi. E Electra; 44) 6.2 mi. W Iowa Park; 45) 6.1 mi. W Iowa Park; 46) 6 mi. W, 8 mi. N Iowa Park; 47) 6 mi. W, 6 mi. N Iowa Park; 48) 6 mi. W, 5 mi. N Iowa Park; 49) 6 mi. W, 4 mi. N Iowa Park; 50) 6 mi. W Iowa Park; 51) 5.5 mi. W Iowa Park; 52) 4.7 mi. NW Iowa Park; 53) 4 mi. W, 6 mi. N Iowa Park; 54) 4 mi. W, 4 mi. N Iowa Park; 55) 4 mi. W, 2 mi. N Iowa Park; 56) 1 mi. W Iowa Park; 57) Iowa Park; 58) 6 mi. E Iowa Park; 59) 6 mi. N Holiday; 60) Burkburnett; 61) 4 mi. S, 1 mi. E Burkburnett; 62) 4 mi. S, 2 mi. E Burkburnett. CLAY CO.: 63) 6.5 mi. W Thornberry; 64) 3 mi. N Thornberry; 65) Thornberry; 66) 3 mi. W, 3 mi. N Charlie; 67) 3 mi. W, 2 mi. N Charlie; 68) 3 mi. W Charlie; 69) 3 mi. W, 3 mi. S Charlie; 70) 2 mi. W Byers; 71) Byers; 72) 7 mi. NE Byers; 73) Henrietta. MONTAGUE CO.: 74) Sunset; 75) Spanish Fort.

ACCOUNTS OF SPECIES

Didelphis virginiana virginiana Kerr, 1792

Virginia Opossum

This species is found throughout north-central Texas (McManus, 1974). Dalquest and Horner (1984) reported that this opossum was less common in the arid habitats in the western part of the study area. Dead animals are seen frequently on highways and roads in the region. A female that we obtained on 26 July had seven young (three females, four males) in the

pouch. In the United States, peak periods of reproduction in the opossum take place from late January through late March and from mid-May to early July (McManus, 1974).

Specimens examined (3).—Wichita County: 6.2 mi. W Iowa Park, 2; 5.5 mi. NW Iowa Park, 1.

Cryptotis parva parva (Say, 1823)

Least Shrew

Dalquest and Horner (1984) reported this species from throughout north-central Texas, and commented that it was not common in the western part of the area. The scarcity of this shrew on the Llano Estacado to the west of this study area was indicated by Whitaker (1974) and was discussed by Owen and Hamilton (1986).

Specimens examined (4).—Cottle County: 10 mi. E, 20 mi. N Paducah, 1. Wichita County: 6.2 mi. W Iowa Park, 1; 4 mi. S, 2 mi. E Burkburnett, 2.

Scalopus aquaticus aereus (Bangs, 1896)

Eastern Mole

This species occurs throughout the study area where soil conditions are favorable (Yates and Schmidly, 1978; Dalquest and Horner, 1984). We have seen signs made by these animals at many places in the area; moles seem especially common in the sandy soils adjacent to the Red River and its tributaries, on golf courses, and in cemeteries. Mounds of earth and ridges from the tunnels made by moles are most evident when soils are moist.

Specimens examined (3).—Wilbarger County: 6 mi. W, 5 mi. N Vernon, 1. Wichita County: Burkburnett, 1; 4 mi. S, 2 mi. E Burkburnett, 1.

Myotis velifer magnamolaris Choate and Hall, 1967

Cave Myotis

This bat ranges across the western part of the area studied. According to Dalquest and Horner (1984), *M. velifer* is common in the western parts of north-central Texas, but it is not known from east of Wichita County. During the summer, these bats may be observed night-roosting in the shelters at Copper Breaks State Park.

Specimens examined (11).—Motley County: 9 mi. E, 8 mi. S Matador, 4. Dickens County: 9 mi. E, 6 mi. N Dickens, 7.

Antrozous pallidus bunkerii Hibbard, 1934

Pallid Bat

Dalquest and Horner (1984) reported this species (as *A. p. pallidus*) from north-central Texas on the basis of a specimen from 8.5 mi. SW Rochester, Haskell County, and described the bat as "... an uncommon resident of the cedar brakes of the extreme western part of north-central Texas." The specimens listed below, all females, were obtained by us on 11 May from behind a concrete slab of a bridge support on the south side of the Red River. Another maternity colony was found roosting between timbers of this bridge on the Oklahoma side of the river. On 19 August, five animals, four young of the year and one post-lactating female, were collected from this site. Some comments on reproduction in these bats were provided by Manning *et al.* (1987). Based on coloration of pelage and size, we tentatively refer these specimens to *A. p. bunkerii*.

Specimens examined (3).—Hardeman County: 20.3 mi. N Goodlett, 3.

Tadarida brasiliensis mexicana (Saussure, 1860)

Brazilian Free-tailed Bat

This species "... may be expected to occur virtually everywhere in north-central Texas, at least in migration" (Dalquest and Horner, 1984). On 19 August, a small colony of *T. brasiliensis* was found beneath a bridge on the Oklahoma side of the Red River across from Hardeman County, Texas. All of the 21 bats that we examined were young of the year. The specimens listed below were obtained on 31 May.

Specimens examined (2).—Motley County: 9 mi. E, 8 mi. S Matador, 2.

Sylvilagus floridanus alacer (Bangs, 1896)

Eastern Cottontail

It appears that this cottontail is distributed throughout north-central Texas (Chapman *et al.*, 1980). For a brief discussion of the recent historic changes in distribution of this species related to corresponding changes in land-use practices, see the comments by Dalquest and Horner (1984).

Specimens examined (18).—Wichita County: 8.7 mi. E Electra, 4; 9 mi. E Electra, 1; 6.2 mi. W Iowa Park, 3; 5.5 mi. NW Iowa Park, 6; 4.7 mi. NW Iowa Park, 4.

Lepus californicus melanotis Mearns, 1890

Black-tailed Jackrabbit

To our knowledge, this taxon occurs throughout the area studied. However, it is possible that the jackrabbit entered the eastern parts of north-central Texas in recent times (Dalquest and Horner, 1984). We have observed these animals in all habitats where we have worked in the region.

Specimens examined (5).—Wichita County: 6 mi. NE Electra, 1; 8.7 mi. E Electra, 1; 9 mi. E Electra, 2; 6 mi. N Holiday, 1.

Spermophilus mexicanus mexicanus (Erxleben, 1777)

Mexican Ground Squirrel

This species reaches the northern limits of its geographic range in north-central Texas (Young and Jones, 1982; Dalquest and Horner, 1984); specimens have been reported from as far north and east as Baylor County. Additional field work needs to be carried out in order to determine the details of the geographic distribution of this species, as well as to determine the ecologic relationships with the other species of ground squirrels.

Specimens examined (11).—Motley County: 5.8 mi. E Matador, 1; 11 mi. E Matador, 1. Dickens County: Dickens, 1. King County: 2.1 mi. W Guthrie, 1. Cottle County: Paducah, 2. Foard County: 18 mi. W Crowell, 1. Knox County: Truscott, 1; Gilliland, 2; Vera, 1.

Spermophilus spilosoma marginatus V. Bailey, 1890

Spotted Ground Squirrel

This species ranges from the west into north-central Texas along the Red River, where it seemingly is confined to the sandy soils of this region (Dalquest and Horner, 1984). There is some evidence to support the theory that this species may be expanding its geographic range to the east along the Red River (Streubel and Fitzgerald, 1978a; Hall, 1981; Dalquest and Horner, 1984). We have expended considerable time and effort searching for ground squirrels in north-central Texas, and it is our impression that *S. spilosoma* is not common there.

Specimens examined (2).—Dickens County: 4 mi. E, 7 mi. N Dickens, 1. Wilbarger County: 0.7 mi. S Odell, 1.

Spermophilus tridecemlineatus texensis Merriam, 1898

Thirteen-lined Ground Squirrel

This species ranges throughout north-central Texas, but the geographic distribution seems somewhat spotty (Streubel and

Fitzgerald, 1978b). Dalquest and Horner (1984) thought that this mammal may have moved into the eastern part of the region during the last century in connection with changes in land-use practices. Our impression is that this sciurid occurs mostly in association with the activities of humans in the area; it seems especially common on golf courses, in cemeteries, and in city parks.

Specimens examined (30).—Motley County: 9 mi. E, 8 mi. S Matador, 1. Foard County: Crowell, 2. Wilbarger County: Vernon, 1. Wichita County: 8.7 mi. E Electra, 1; 6.2 mi. W Iowa Park, 2; 4 mi. W, 2 mi. N Iowa Park, 1; Iowa Park, 1; Burkburnett, 2; 4 mi. S, 2 mi. E Burkburnett, 15. Clay County: Byers, 2; Henrietta, 1. Montague County: Spanish Fort, 1.

Cynomys ludovicianus ludovicianus (Ord, 1815)

Black-tailed Prairie Dog

Colonies of this species are rather scarce in the area studied. The animals seem considerably more common in the western parts of the region. They no longer occur in numerous places where we saw them during the past 20 years. The specimens listed below are from a locality where the animals no longer occur.

Specimens examined (2).—Wichita County: 8.7 mi. E Electra, 2.

Sciurus niger rufiventer É. Geoffroy St.-Hilaire, 1803

Fox Squirrel

Fox squirrels range throughout the region in suitable habitat. In addition, we have seen them and obtained specimens in areas where the oak trees were no more than a meter tall, especially in the western parts of the region. These animals seem especially abundant in areas where there are stands of trees, such as city parks, cemeteries, and road-side rest areas.

Specimens examined (9).—Dickens County: 9 mi. E, 11 mi. N Dickens, 1. Hardeman County: 14.8 mi. N Goodlett, 1. Wichita County: Burkburnett, 2; 1 mi. W Iowa Park, 1. Clay County: 3 mi. W Charlie, 2. Knox County: 3 mi. E Benjamin, 1. Montague County: Sunset, 1.

Geomys bursarius major Davis, 1940

Plains Pocket Gopher

This pocket gopher is distributed in all of north-central Texas where appropriate soil conditions occur. Areas of dense clay soils, rocky areas, and steep slopes generally are avoided (Dalquest and Horner, 1984). As with several other species of mammals that occur in north-central Texas, the geographic distribution and

abundance of *G. bursarius* seemingly have been enhanced by activities of humans. This species seems especially common on golf courses, in parks and cemeteries, along sides of roads, and on the edges of fields in the area.

We follow Jones *et al.* (1986) in continuing to recognize this species of pocket gopher as the one that inhabits this geographic area.

Specimens examined (44).—Dickens County: 9 mi. E, 6 mi. N Dickens, 1. Foard County: Thalia, 2. Wilbarger County: 6 mi. W, 5 mi. N Vernon, 2; 5 mi. E Odell, 1. Wichita County: 6.2 mi. W Iowa Park, 4; 4 mi. S, 2 mi. E Burkburnett, 34.

Perognathus flavus merriami J. A. Allen, 1892

Silky Pocket Mouse

This species has been recorded from most of the counties in north-central Texas (Dalquest and Horner, 1984). We captured these mammals in grassy areas along roads and at the edges of fields, as well as in mesquite grasslands, usually in association with other heteromyid rodents. We agree with Dalquest and Horner, (1984) that at certain times and localities these mice are abundant and easy to obtain, but at other times at the same localities they seem quite scarce.

Specimens examined (88).—Wichita County: 8.7 mi. E Electra, 7; 6.2 mi. W Iowa Park, 72; 6 mi. W, 5 mi. N Iowa Park, 1; 5.5 mi. NW Iowa Park, 5; 4.7 mi. NW Iowa Park, 3.

Chaetodipus hispidus hispidus (Baird, 1858)

Hispid Pocket Mouse

This species is found throughout the study area. This pocket mouse prefers sparse grasses and prairies (Dalquest and Horner, 1984); it occurs also in humid prairies and brushlands. This species seems much more common at certain times and places than at other times and other collecting sites.

Specimens examined (78).—Motley County: 9 mi. E, 8 mi. S Matador, 5. Cottle County: 10 mi. E, 20 mi. N Paducah, 1. Hardeman County: 8.3 mi. N Quanah, 4. Wichita County: 4 mi. N Electra, 1; 8.7 mi. E Electra, 3; 6.2 mi. W Iowa Park, 46; 5.5 mi. NW Iowa Park, 1; 4.7 mi. NW Iowa Park, 1; 4 mi. W, 6 mi. N Iowa Park, 1; 4 mi. S, 2 mi. E Burkburnett, 7. Clay County: 6.5 mi. W Thornberry, 1; 3 mi. W, 3 mi. N Charlie, 6; 2 mi. W Byers, 1.

Dipodomys elator Merriam, 1894

Texas Kangaroo Rat

The geographic range of this species includes nine counties in north-central Texas and two counties in adjacent Oklahoma

(Carter *et al.*, 1985; Baumgardner, 1987). There are no records of this rodent since early in this century from Clay County, Texas (Martin and Matocha, 1972). There is considerable evidence that the geographic range of the Texas kangaroo rat has been reduced even further in recent years because of widespread changes in land-use practices throughout the region (Dalquest and Horner, 1984; Jones and Bogan, 1986).

Specimens examined (100).—Wichita County: 8.7 mi. E Electra, 30; 5.7 mi. E Electra, 1; 4 mi. E Electra, 3; 2.5 mi. E Haynesville, 1; 7 mi. E Haynesville, 1; 6.2 mi. W Iowa Park, 22; 6 mi. W, 8 mi. N Iowa Park, 1; 6 mi. W, 6 mi. N Iowa Park, 1; 6 mi. W, 4 mi. N Iowa Park, 1; 6 mi. W Iowa Park, 1; 5.5 mi. NW Iowa Park, 28; 4.7 mi. NW Iowa Park, 10.

Dipodomys ordii richardsoni (J. A. Allen, 1891)

Ord's Kangaroo Rat

This kangaroo rat occurs across north-central Texas as far east as Montague County (Dalquest and Horner, 1984). This species is much more abundant and widespread in the western part of the region than in the eastern sections of the area studied. *Dipodomys ordii* is associated with sandy soils along the Red River, as well as elsewhere.

Specimens examined (50).—Motley County: 9 mi. E, 8 mi. S Matador, 3. Dickens County: 3.5 mi. N Dickens, 1; 6 mi. E, 5 mi. N Dickens, 4; 9 mi. E, 6 mi. N Dickens, 6. Hardeman County: 20.3 mi. N Goodlett, 2. Foard County: 6 mi. E Thalia, 12. Wilbarger County: 6 mi. W, 5 mi. N Vernon, 13; 15 mi. N, 1 mi. E Vernon, 4; 1 mi. E, 2 mi. N Elliott, 3. Wichita County: 10 mi. N Electra, 2.

Reithrodontomys fulvescens laceyi J. A. Allen, 1896

Fulvous Harvest Mouse

This harvest mouse now may occur throughout north-central Texas wherever dense grasses and patches of weeds occur (Spencer and Cameron, 1982; Dalquest and Horner, 1984). Specimens obtained by us were trapped in stands of dense vegetation either along roads or at the edges of fields. Dalquest and Horner (1984) provided a discussion of recent changes in the geographic distribution of this species, as well as some comments on the ecological relationships with *R. montanus*.

Specimens examined (3).—Wilbarger County: 15 mi. N, 1 mi. E Vernon, 1. Wichita County: 4 mi. S, 2 mi. E Burkburnett, 1. Clay County: 3 mi. W, 3 mi. S Charlie, 1.

Reithrodontomys montanus griseus V. Bailey, 1905

Plains Harvest Mouse

It appears that the plains harvest mouse is found only in the more arid parts of the area studied (Wilkins, 1986); it is absent from the eastern part of the region (Dalquest and Horner, 1984). Specimens obtained by us were caught in an open mesquite grassland. For a discussion of recent changes in the distribution of this species, see the work by Dalquest and Horner (1984).

Specimens examined (8).—Wichita County: 6.2 mi. W Iowa Park, 8.

Peromyscus attwateri J. A. Allen, 1895

Texas Mouse

The Texas Mouse occurs in the eastern, southern, and western portions of the area; it is absent from the central part of north-central Texas (Schmidly, 1974; Dalquest and Horner, 1984). Our specimens were caught in traps set in a rocky area vegetated by small juniper trees.

Specimens examined (14).—Hardeman County: 13 mi. S Quanah, 14.

Peromyscus leucopus texanus (Woodhouse, 1853)

White-footed Mouse

This species occurs throughout north-central Texas (Lackey *et al.*, 1985). Dalquest and Horner (1984) reported specimens from each of the counties in the region. We obtained examples of this mouse at most localities where we attempted to collect mammals; we were impressed with the broad range of habitats and types of vegetation in which we captured specimens of this species.

Specimens examined (185).—Motley County: 9 mi. E, 8 mi. S Matador, 1. Hardeman County: 20.3 mi. N Goodlett, 1; 4.3 mi. W Quanah, 2; 8.3 mi. N Quanah, 4; 13 mi. S Quanah, 1; 14 mi. S Quanah, 1. Foard County: 6 mi. E Thalia, 4. Wilbarger County: 6 mi. W, 5 mi. N Vernon, 11; 15 mi. N, 1 mi. E Vernon, 7; 1 mi. E, 2 mi. N Elliott, 7. Wichita County: 4 mi. N Electra, 1; 6.2 mi. W Iowa Park, 101; 4 mi. W, 6 mi. N Iowa Park, 1; 4 mi. W, 2 mi. N Iowa Park, 5; 4 mi. S, 2 mi. E Burkburnett, 13. Clay County: 3 mi. N Thornberry, 1; Thornberry, 1; 3 mi. W, 3 mi. N Charlie, 1; 3 mi. W, 2 mi. N Charlie, 1; 3 mi. W, 3 mi. S Charlie, 4; 7 mi. NE Byers, 17.

Peromyscus maniculatus pallescens J. A. Allen, 1896

Deer Mouse

According to Dalquest and Horner (1984), this species occurs throughout north-central Texas. We found *P. maniculatus* less common and not as widely distributed as the white-footed mouse.

Specimens examined (67).—Wilbarger County: 15 mi. N, 1 mi. E Vernon, 4. Wichita County: 6.2 mi. W Iowa Park, 13. Clay County: 3 mi. N Thornberry, 11; Thornberry, 6; 3 mi. W, 3 mi. N Charlie, 4; 3 mi. W, 2 mi. N Charlie, 11; 3 mi. W, 3 mi. S Charlie, 18.

Baiomys taylori taylori (Thomas, 1887)

Northern Pygmy Mouse

“Until 1960, the pigmy [*sic*] mouse was not known from north-central Texas. Since that date the species has extended its range northward and may now occur in all counties of the eastern and central parts of our area” (Dalquest and Horner, 1984). They had no specimens available from west of Baylor County. This species has been reported from south-central Oklahoma north of the Red River (Stangl and Dalquest, 1986). Cleveland (1986) listed two specimens from 3 km. NW Esteline, Hall County, Texas; these specimens were collected in 1983 from north of the Prairie Dog Town Fork of the Red River. Two specimens collected in 1976 from 16.09 km. NNW Goodlett, Hardeman County, Texas, were reported by Austin and Kitchens (1986). The northernmost record of this species in North America was reported by Hollander *et al.* (1987) from 9 mi. E Lutie, Collingsworth County, Texas, in the eastern Panhandle.

Specimens examined (1).—Cottle County: 10 mi. E, 20 mi. N Paducah, 1.

Onychomys leucogaster articeps Rhoads, 1898

Northern Grasshopper Mouse

The geographic distribution of this taxon includes the western parts of the area studied and along the Red River as far east as Wichita County (McCarty, 1978; Dalquest and Horner, 1984).

Specimens examined (11).—Motley County: 9 mi. E, 8 mi. S Matador, 1. Dickens County: 6 mi. E, 5 mi. N Dickens, 2; 9 mi. E, 6 mi. N Dickens, 5. Foard County: 6 mi. E Thalia, 1. Wilbarger County: 6 mi. W, 5 mi. N Vernon, 2.

Sigmodon hispidus texianus (Audubon and Bachman, 1853)

Hispid Cotton Rat

This species ranges throughout the area studied (Cameron and Spencer, 1981; Dalquest and Horner, 1984). We encountered these animals in vegetation along roads and at the edges of fields. In addition, cotton rats were trapped in mesquite grasslands subjected to grazing by livestock. As is the case with some other mammals, old cemeteries seem to provide suitable habitats.

Specimens examined (94).—Cottle County: 10 mi. E., 20 mi. N Paducah, 1. Hardeman County: 4.3 mi. W Quanah, 2; 8.3 mi. N Quanah, 4; 14 mi. S Quanah, 4. Wichita County: 8.7 mi. E Electra, 3; 6.2 mi. W Iowa Park, 49; 6.1 mi. W Iowa Park, 2; 5.5 mi. NW Iowa Park, 2; 4 mi. S, 2 mi. E Burkburnett, 19. Clay County: Thornberry, 6; 3 mi. W, 3 mi. S Charlie, 2.

Neotoma albigula albigula Hartley, 1894

White-throated Woodrat

This species reaches the eastern limits of its geographic range in the western part of north-central Texas (Dalquest and Horner, 1984). The specimen reported herein was caught in a rat trap set by a woodrat nest at the base of a juniper tree. In the same area, we saw numerous nests of woodrats, either at the bases of juniper trees or in rocky crevices. Subsequent trapping at the same site yielded only specimens of *N. micropus*.

Specimens examined (1).—Hardeman County: 13 mi. S Quanah, 1.

Neotoma micropus micropus Baird, 1855

Southern Plains Woodrat

The geographic range of this species extends across north-central Texas (Dalquest and Horner, 1984). It appears that the animals are considerably more common in the mesquite grasslands in the western part of the study area. In some places, it seems as though there is a woodrat nest at the base of almost every mesquite shrub, with well-worn runways between the shrubs.

Specimens examined (50).—Motley County: 9 mi. E, 8 mi. S Matador, 8. Dickens County: 9 mi. E, 6 mi. N Dickens, 1. Cottle County: 10 mi. E, 20 mi. N Paducah, 1. Hardeman County: 4.3 mi. W Quanah, 3; 13 mi. S Quanah, 2. Foard County: 6 mi. E Thalia, 1. Wilbarger County: 6 mi. W, 5 mi. N Vernon, 1. Wichita County: 8.7 mi. E Electra, 7; 9 mi. E Electra, 1; 6.2 mi. W Iowa Park, 17; 6.1 mi. W Iowa Park, 2; 5.5 mi. NW Iowa Park, 3; 4.7 mi. NW Iowa Park, 3.

Rattus rattus (Linnaeus, 1758)

Black Rat

These rats are known to occur throughout north-central Texas wherever humans live (Dalquest and Horner, 1984). The specimen reported herein was trapped in a shallow ditch along a road about 600 meters from the nearest human habitation.

Specimens examined (1).—Wichita County: 4 mi. W, 4 mi. N Iowa Park, 1.

Mus musculus brevirostris Waterhouse, 1837

House Mouse

This species is known to occur in all parts of north-central Texas, especially in towns and cities (Dalquest and Horner, 1984). It seems to us that the house mouse is more common in the eastern part of the region, but it is becoming numerous in the west.

Specimens examined (8).—Wichita County: 6.2 mi. W Iowa Park, 4; 4 mi. W, 4 mi. N Iowa Park, 1. Clay County: Thornberry, 2; 3 mi. W, 2 mi. N Charlie, 1.

Canis latrans frustror Woodhouse, 1851

Coyote

The ubiquitous coyote ranges throughout the study area (Bekoff, 1977). Dalquest and Horner (1984) reported that coyotes might be found almost anywhere in north-central Texas, even on the outskirts of towns and cities. Carcasses of coyotes are encountered frequently on highways and roads, as well as hanging from fences in the region. It is a rare night in the field in north-central Texas that coyotes are not heard howling in the area.

Specimens examined (3).—Dickens County: 0.3 mi. N Dickens, 1. Wichita County: 6 mi. E Iowa Park, 1; 4 mi. S, 1 mi. E Burkburnett, 1.

Taxidea taxus berlandieri Baird, 1858

Badger

This mustelid is known from all of north-central Texas (Long, 1973). Dalquest and Horner (1984) reported that it was not common in the eastern counties of the region. The eastward extension of the geographic range of this species in relation to changes in land-use practices was discussed by Schmidly (1983, 1984a). We noted some evidence of badgers on the sandy terraces along the Red River.

Specimens examined (1).—Baylor County: 12 mi. NE Seymour, 1.

Mephitis mephitis mesomelas Lichtenstein, 1832

Striped Skunk

It is apparent that these skunks occur everywhere within the area studied (Wade-Smith and Verts, 1982; Dalquest and Horner, 1984). This is the most common animal seen dead along highways and roads in north-central Texas. A specimen obtained

by us on 26 July contained a total of eight embryos (four females, four males). According to Wade-Smith and Verts (1982), "Wild striped skunks throughout their range usually breed during February or March. Parturition usually occurs in May and early June."

Specimens examined (5).—Wichita County: 6.2 mi. W Iowa Park, 2; 5.5 mi. NW Iowa Park, 1; 4.7 mi. NW Iowa Park, 2.

DISCUSSION

The preceding accounts include only those species of mammals for which we obtained specimens that are deposited in museums and which, to our knowledge, have not been reported previously in the literature. Several additional taxa of mammals occur in north-central Texas. For example, the raccoon (*Procyon lotor*) ranges throughout the area: it is especially common in the vicinity of rivers, streams, and around human habitations in the eastern part of the area studied. Beavers (*Castor canadensis*) and their signs (tracks, bank burrows, cut branches) were seen frequently along the banks of the Red River and its tributaries. The nine-banded armadillo (*Dasypus novemcinctus*) is known from all of north-central Texas; like some of the other mammals, it seems considerably more common in the eastern part of the region. The porcupine (*Erethizon dorsatum*) ranges into the study area from the west. We have seen the remains of this mammal on highways in Motley and Cottle counties, but we were not able to salvage a specimen. White-tailed deer (*Odocoileus virginianus*) occur in suitable habitat throughout the area. On several occasions, we observed small herds of pronghorn (*Antilocapra americana*) as far east as Motley County. The bobcat (*Felis rufus*) is still present in the area; we have observed animals in Wichita and Baylor counties.

Nearly all of the land in the area studied is private property. Except for some parks (Cooper Breaks, Lake Arrowhead) that are managed by the Texas Department of Parks and Wildlife, the management practices with regard to land use are the responsibilities of the individuals who own, rent, live on, and use the land in north-central Texas. As discussed by Dalquest and Horner (1984) and Schmidly (1984b), changes in land-use practices in north-central Texas in particular and throughout the state in general have impacted the distributions of the terrestrial mammals that remain in the state. Nearly all of the land in north-central Texas is utilized for agricultural practices of some

kind. Much of the land is used for cattle grazing. The sandy soils of the river terraces are utilized heavily for agriculture where they are level and accessible. Vast areas of mesquite grasslands and woodlands have been eradicated to make room for grass and crops. Only on rough and broken land does any appreciable amount of original vegetation persist. Agriculture and other activities of humans have so affected the bulk of the lands of north-central Texas that the original nature of the land and the vegetation hardly can be perceived.

Some major changes in the geographic ranges of some species of mammals have occurred in recent years. For example, *D. novemcinctus* did not occur in north-central Texas until about 1925; *R. fulvescens* and *B. taylori* were unknown in the area until after 1950 (Dalquest and Horner, 1984). There is evidence that *B. taylori* is continuing to expand its geographic range (Austin and Kitchens, 1986; Cleveland, 1986; Stangl and Dalquest, 1986; Hollander *et al.*, 1987). In addition, there is evidence that fluctuations in numbers of *B. taylori* and *R. fulvescens* are directly related to the annual vegetation cycle, especially with regard to increased plant cover that develops in response to increased rainfall. For detailed discussions of these relationships, as well as information on interspecific competition between *B. taylori*, *R. fulvescens*, and *S. hispidus*, see the work by Turner and Grant (1987). Dalquest and Horner (1984) indicated that *R. fulvescens* was becoming more widespread, whereas *R. montanus* was more limited in distribution. Some similar changes in the geographic distributions of leporids have been observed; *S. auduboni* has become absent from much of the general geographic region, whereas *S. floridanus* has become more widespread and common (Dalquest and Horner, 1984).

Examination of recent records of the occurrence of some species of mammals indicates that there may be some expansions of geographic ranges directly related to land-management practices. For example, Schmidly (1983, 1984a) reported that the geographic range of *T. taxus* had been extended eastward as a result of land-clearing operations. In addition, the geographic ranges of species such as *D. ordii*, *S. spilosoma*, and *O. leucogaster* seemingly have been expanded to the east as a result of land-use practices, as well as the encroachment of additional deposits of sand into the substrate along the south side of the Red River. Other species of mammals, such as *S. aquaticus*, *G. bursarius*, and *S. niger* apparently have become common in local areas as a direct result

of activities of humans; cemeteries, golf courses, and parks have provided habitats for these animals. Changes in the distributions of species such as *C. latrans*, *F. rufus*, and *C. ludovicianus* coincide with changes in agricultural practices, including predator-control and pest-control activities.

We were impressed with some of the changes in local populations of small mammals that we have observed over time in north-central Texas. For example, at a place 6.2 mi. W Iowa Park, Wichita County, we caught a total of 69 rodents (*P. flavus*, 8; *C. hispidus*, 6; *D. elator*, 4; *S. hispidus*, 43; *N. micropus*, 8) in 75 snap traps (50 museum special, 25 rat) set for two nights in early September 1969. The same number of traps set at the same place for two nights in early September 1986 yielded a total of six mice (*P. leucopus*, 4; *M. musculus*, 2). We are aware that natural biological phenomena impact local populations of small mammals, especially some rodents. However, at the aforementioned locality the vegetation and the populations of small mammals obviously have been changed greatly by agricultural practices also.

One species of mammal native to north-central Texas (*D. elator*) is considered as threatened by the Texas Department of Parks and Wildlife (1986), listed in category two by the U.S. Fish and Wildlife Service (1985), and considered rare by the International Union for Conservation of Nature and Natural Resources (1986). There is considerable evidence that the geographic range of this species has been reduced in recent times (Martin and Matocha, 1972; Dalquest and Horner, 1984; Carter *et al.*, 1985; Jones and Bogan, 1986).

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